IN THE CLAIMS

1. (currently amended) An apparatus for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone in the spinal column, and having a first toroidal saddle shaped articulation surface including a first concave arc extending between leading and trailing ends of the first articulation surface and a first convex arc extending between first and second lateral ends of the first articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone in the spinal column, and having a second toroidal saddle shaped articulation surface including a second convex arc extending between leading and trailing ends of the second articulation surface and a second concave arc extending between first and second lateral ends of the second articulation surface, wherein the first concave arc has a radius that is greater than the radius of the second convex arc and the second concave arc has a radius that is greater than the radius of the first convex arc, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to articulate in at least one of flexion, extension and lateral bending.

2. (original) The apparatus of claim 1, wherein the first and second articulation surfaces are sized and shaped to define at least one of: (i) a first center of rotation for at least one of flexion and extension that is located outside the intervertebral disc space, and (ii) a second center of rotation

for lateral bending that is located outside the intervertebral disc space.

3. (original) The apparatus of claim 2, wherein the first center of rotation is located outside the intervertebral disc space in one direction and the second center of rotation is located outside the intervertebral disc space in an opposite direction.

4. (original) The apparatus of claim 1, wherein the first and second articulation surfaces are formed from one or more metals or metal alloys to achieve metal-to-metal engagement.

5. (currently amended) The apparatus of claim 4, wherein the one or more metals or metal alloys are selected from the group consisting ~~include at least one~~ of cobalt, chromium, stainless steel, and titanium.

6. (original) The apparatus of claim 1, wherein at least one of the first and second articulation surfaces are formed from one or more non-metals.

7. (original) The apparatus of claim 6, wherein the one or more non-metals are taken from the group consisting of polymers and ceramic materials.

8. (currently amended) An apparatus for replacing at least a portion of an intervertebral disc of a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone, and having a first saddle shaped articulation surface including a single concave arc extending between leading and trailing ends of the first articulation surface and a single convex arc extending between first and second lateral ends of the first articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone, and having a second saddle shaped articulation surface including a single convex arc extending between leading and trailing ends of the second articulation surface and a single concave arc extending between first and second lateral ends of the second articulation surface, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second saddle shaped articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to at least axially rotate relative to one another through a range of angles, wherein the single concave arc of the first articulation surface has a radius that is greater than the single convex arc of the second articulation surface and the single concave arc of the second articulation surface has a radius that is greater than the radius of the single convex arc of the first articulation surface.

9. (original) The apparatus of claim 8, wherein the first and second articulation surfaces are sized and shaped to achieve substantial point-to-point contact relative to one another when in at least some positions of flexion, extension, lateral bending, and/or axial rotation.

10. (currently amended) The apparatus of claim 8, wherein:

the single concave arc of the first saddle shaped articulation surface ~~is defined by a concave arc, generally of~~ has a radius A about a first axis substantially perpendicular to an anterior-posterior plane of the spinal column, and ~~a~~the single convex arc of the first saddle shaped articulating surface has a ~~, generally of~~ radius B about a first axis substantially perpendicular to a lateral plane of the spinal column;

the single convex arc of the second saddle shaped articulation surface has a ~~is defined by a convex arc, generally of~~ radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and ~~a~~the single concave arc of the second saddle shaped articulation surface has a ~~, generally of~~ radius D about a second axis substantially perpendicular to the lateral plane of the spinal column; and

the radius A of the single concave arc of the first articulation surface is greater than the radius C of the single convex arc of the second saddle shaped articulation surface in order to permit axial rotation of the first and second articulation surfaces relative to one another.

11. (currently amended) The apparatus of claim 10, wherein the radius D of the single concave arc of the second articulation surface is greater than the radius B of the single convex arc of the first articulation surface in order to permit axial rotation of the first and second articulation surfaces relative to one another.

12. (currently amended) An apparatus for replacing at least a portion of an intervertebral disc of a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone, and having a first saddle shaped articulation surface including a concave arc extending between leading and trailing ends of the first articulation surface and a convex arc extending between first and second lateral ends of the first articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone, and having a second saddle shaped articulation surface including a convex arc extending between leading and trailing ends of the second articulation surface and a concave arc extending between

first and second lateral ends of the second articulation surface, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to axially rotate relative to one another through a range of angles without substantially displacing the first and second vertebral bones away from one another, wherein the concave arc of the first articulation surface has a radius that is greater than the convex arc of the second articulation surface and the concave arc of the second articulation surface has a radius that is greater than the convex arc of the first articulation surface.

13. (original) The apparatus of claim 12, wherein the range of angles is about plus/minus three degrees from a resting position.

14. (original) The apparatus of claim 12, wherein the first and second articulation surfaces are sized and shaped such that the first and second vertebral bones are displaced away from one another at axial rotations outside the range of angles.

15. (currently amended) The apparatus of claim 12, wherein:

the concave arc of the first saddle shaped articulation surface has a ~~is defined by a concave arc, generally of~~ radius A about a first axis substantially perpendicular to an anterior-posterior plane of the spinal column, and ~~a~~the convex arc of the first saddle shaped articulation surface has a ~~, generally of~~ radius B about a first axis substantially perpendicular to a lateral plane of the spinal column; and

the convex arc of the second saddle shaped articulation surface has a~~is defined by a convex arc, generally of~~ radius C

about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and ~~a~~ the concave arc of the second saddle shaped articulation surface has a ~~, generally of~~ radius D about a second axis substantially perpendicular to the lateral plane of the spinal column.

16. (currently amended) The apparatus of claim 15, wherein the radius A of the concave arc of the first articulation surface is greater than the radius C of the convex arc of the second articulation surface.

17. (currently amended) The apparatus of claim 15, wherein the radius D of the concave arc of the second articulation surface is greater than the radius B of the convex arc of the first articulation surface.

18. (currently amended) The apparatus of claim 15, wherein the radius A of the concave arc of the first articulation surface is about 0.329 inches, the radius B of the convex arc of the first articulation surface is about 0.340 inches, the radius C of the convex arc of the second articulation surface is about 0.280 inches, and the radius D of the concave arc of the second articulation surface is about 0.401 inches.